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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,264	10/04/2005	Kimiaki Tsutsui	273634US0PCT	1847

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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

LISTVOYB, GREGORY

ART UNIT	PAPER NUMBER
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1796

NOTIFICATION DATE	DELIVERY MODE
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01/07/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No. 10/538,264	Applicant(s) TSUTSUI ET AL.	
	Examiner GREGORY LISTVOYB	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-12,15-18 and 20-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-12,15-18 and 20-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is issued as a result of Applicant Remarks filed on 12/11/2009.

Advisory Action filed on 11/16/2009 has been withdrawn.

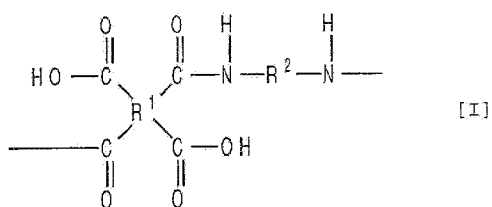
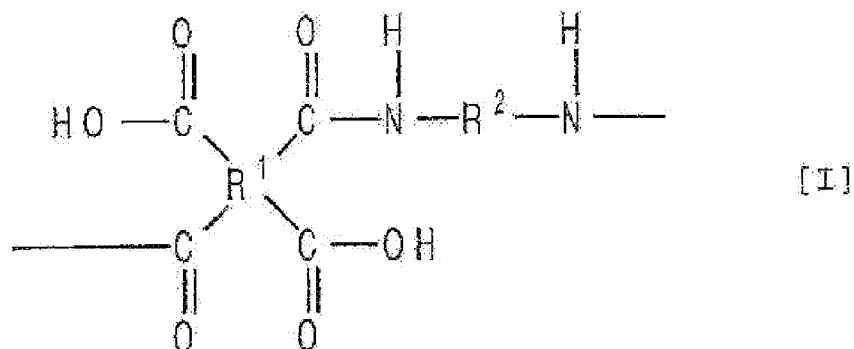
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-12, 14-18 and new claims 20-23 rejected under 35 U.S.C. 103 as being unpatentable over Sawahara et al (US 6294639) herein Sawahata in view of Kawada (US 5158619) herein Kawada (both cited in the previous Office Action).

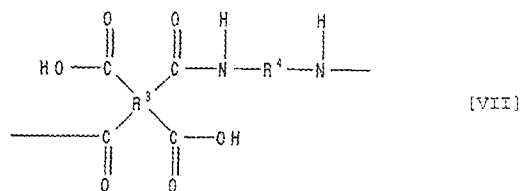
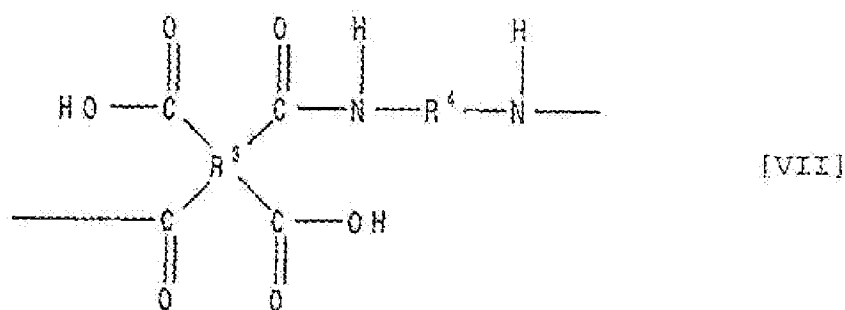
Sawahata discloses a liquid crystal aligning agent comprising a polyimide precursor having a structural unit represented by the formula (I) (see Abstract):



where R1 is a tetravalent organic group constituting a tetracarboxylic acid which has an alicyclic structure, meeting the limitations of Claim 4 (see Abstract) and R2 is a bivalent organic group constituting a diamine.

Sawahata teaches that R1 is bicyclo[3,3,0]octane-2,4,6,8-tetracarboxylic dianhydride (BODA) (see Example 1), which is the same material as uses in the Application.

In addition, Sawahata discloses a polyimide, having formula (VII):



where R₃ is a tetravalent organic group constituting a tetracarboxylic acid, and R₄ is a bivalent organic group constituting a diamine, such as one having repeating CH₂ groups in the structure (i.e. 1,2-diaminoethane, 1,3-diaminopropane, 1,4-diaminobutane and 1,6-diaminohexane, see Column 8, line 35)). In reference to Claim 8, Sawahata teaches 100% of aromatic diamine in the polyamide structure (see Example 1)

Sawahata teaches that polyamic acids of structures (I and VII) or polyamic acid and polyimide can be used together in preparation of a liquid crystal aligning agent (see Example 10).

Regarding Claim 5, 6 and 8-11 Sawahata teaches 10% -80% of alicyclic tetracarboxylic acid anhydride and aromatic tetracarboxylic acid dianhydride (i.e. pyromellitic, see Column 7, line 50). The advantage of having aromatic dianhydride in the polyimide structure is well known in the art. The addition of aromatics, for instance, among other advantages, increases Young modulus of the film and decreases water uptake.

Therefore, it would have been obvious to a person of ordinary skills in the art at the time of the invention was made to use reasonable amount of aromatic tetracarboxylic acid dianhydride (i.e. 20% mol or more) in order to increase Young modulus of the film and decreases water uptake.

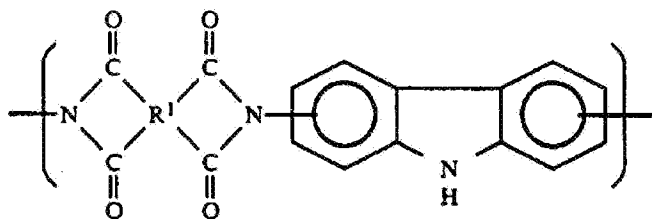
Regarding claims 7, 12 and 14-18, Sawahata teaches that his aligning film is used as a part of a liquid crystal display device (see Column 1, line 5). Hence, all variations of structures, disclosed above are aligning films used in liquid crystal display device.

Regarding new claim 20, Sawahata teaches R3 of formula VII can be represented by aromatic tetracarboxylic acid (see Column 7, line 50).

Regarding new claims 21-23, Sawahata teaches 1,2,3,4 cyclobutanetetracarboxylic acid (see Column 6, line 1), which can be used along with aromatic and bicyclotetracarboxylic acids (see Column 6, line 10).

Sawahata does not teach a polyamic acid having carbazole group.

Kawada teaches a polyimide obtained by cyclodehydration of a polyamic acid (dehydrating to cause ring closure, column 4, lines 60-63), obtained by reacting tetracarboxylic acid dianhydride with diaminocarbazole (column 4, lines 64-65) with the following formula:



where R1 can be represented by cyclopentane tetracarboxylic anhydride (meeting the limitations of Claim 4 and new claim 21) or aromatic tetracarboxylic anhydride (meeting the limitations of claim 5) (see Table 1).

Kawada teaches a polyimide obtained by cyclodehydration of a polyamic acid (dehydrating to cause ring closure, column 4, lines 60-63), obtained by reacting one tetracarboxylic dianhydride with diaminocarbazole (column 4, lines 64-65).

Kawada teaches that his polymer can be used in optical devices, such as solar batteries (see Column 1, line 15). Kawada teaches that his material possesses good heat stability, workability of forming into a desired shape, easiness of production and inexpensiveness. Kawada teaches that his polyimide possesses high heat stability (see Table 1), which is important to liquid crystal alignment film. In addition, due to the presence of active NH group in a carbazole ring, good peeling resistance is expected due to Hydrogen bond interaction between the polymer and a substrate.

Therefore, it would have been obvious to a person of ordinary skills in the art at the time of the invention was made that use such monomer as diaminodiphenylamine in range of 10-100% in Sawahara's polyimide precursor allows to prepare liquid crystal aligning agent with high heat stability, good workability, easiness of production and inexpensiveness, as well an enhanced resistance to peeling.

Sawahata does not disclose volume resistivity values for his composition as it claimed in Claim 1.

However, he discloses a high voltage holding ratio (see Example 10), which depends on a polyamide structure and characterizes electrical resistance of the liquid crystal aligning agent. In Examiner's position, since Sawahata and the Applicant use

polyamic acids of similar structure, Sawahara's composition as modified with Kawada, would have a volume resistivity values between $10E10$ to $10E14$ Ohm/cm.

Response to Arguments

Applicant's arguments filed on 9/28/2009 have been fully considered but they are not persuasive.

Applicant argues that Kawada's disclosure does not provide specific improvements, related to carbazole units.

Examiner disagrees. Kawada analyses different classes of materials (see Column 1, lines 30-65), which are used in photoconductive devices and concluded that carbazole-based polyimide has the best combination of heat resistance, workability and photo-transducing efficiency compare to other materials. In addition, due to the presence of active NH group in a carbazole ring, good peeling resistance is expected due to Hydrogen bond interaction between the polymer and a substrate. (The last statement based on the fact that the presence of active NH groups leads to a better contact with a substrate. Comparing, for instance, polyamides and polyesters, the former material typically have better adhesiveness to the substrate.)

Regarding Sawahata, Applicant argues that Example 10 does not disclose a mixture of polyamic acids but instead discloses a mixture that contains a polyamic acid component and a polyimide component. In addition, Applicant submits that the mixture of Example 10 provides bad electronic properties.

However, Claim 1 does not require two polyamic acids. Instead, it claims two polyamic acids or polyamic acid and polyimide.

Regarding electronic properties of the material of the Example 10, Sawahata clearly states that the material shows high voltage holding properties (see Column 15, line 1), comparable with single polyimide of Example 7. Again, the motivation of using the mixture of two polyamic acids is not necessarily increase the voltage holding values, but rather improve mechanical (Young modulus) and physical (water uptake) properties of the material.

Applicant submits that the inventive Examples of the Application examined have better voltage holding capability than sample of Example 10 of Sawahata.

Examiner disagrees. Firstly, material of Comparative Example 2 of Specification is not equal to material of Example 10 of Sawahata. (In order to demonstrate unexpected results, direct comparison of the inventive Example with closest prior art should be provided). Secondly, the difference between Comparative Example 2 and Inventive Example 12 in voltage holding capability is miniscule. In fact, at 23C both

samples show the same value of 98.9%. At 90C the difference is about 1%, which is likely to be within the experimental error.

Regarding new claims, applicant submits that Sawahata emphasizes the importance of R1 being a multi-ring cycloaliphatic structure. Therefore, Sawahata does not suggest cyclobutanetetracarboxylic acid.

Examiner disagrees. Sawahata openly teach cyclobutanetetracarboxylic acid dianhydride as a polyimide component. Note that open claim language of claim 1 ("comprising") permits the simultaneous presence of cycloaliphatic units of different nature.

Examiner agrees with Applicant arguments regarding rejection under 35 USC 112(2), resulting in the rejection withdrawal.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREGORY LISTVOYB whose telephone number is (571)272-6105. The examiner can normally be reached on 10am-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James J. Seidleck/

Supervisory Patent Examiner, Art Unit 1796

GL